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ADWD-148

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LAMD-327

FAMILY COMMITTEE
Minutes of Thirteenth Meeting
June 8, 1950

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DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1ST REVIEW DATE: 2-23-96 ① TERMINATION (CIRCLE NUMBER)
AUTHORITY: DADC CLASSIFICATION REMAINED
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2ND REVIEW DATE: 2-27-97 ③ COORDINATE WITH:
AUTHORITY: ADD ④ CLASSIFICATION CANCELLED
NAME: ⑤ CLASSIFIED INFO BRACKETED

A. Attendance.

The thirteenth meeting of the Family Committee was held Thursday, June 8, 1950 at 1:15 P.M. in Room B-117. Those present were:

H. M. Agnew	E. R. Jette
H. V. Argo	D. P. MacDougall
J. C. Clark	J. C. Mark
F. de Hoffmann	W. E. Ogle
D. K. Froman	F. Reines
R. W. Goranson	F. Seitz
A. C. Graves	R. F. Taschek
D. B. Hall	E. Teller, Chairman
M. B. Holloway	

B. Minutes of the Twelfth Meeting.

The Committee unanimously adopted the minutes of the Twelfth Meeting reported in ADWD-146, with the following additions and corrections:

(1)

DOE
(3)

(2)

C. TENEX.

Agnew gave a summary of the conclusions which had led him and Argo to report favorably on the possibility of performing TENEX for the Spring '51 tests. (These arguments are outlined in detail in ADWD-142.) It was estimated that about two scopes would be required at both stations with possibly some more scopes as a timing tie-in. The scope figures are here reported in order to give an indication of the order of magnitude involved. The distant station is needed to measure the energy spread due to temperature in the 14 mev neutrons. The close station establishes the fact that the actual DT reaction occurred in a time short compared to the time signal in the distant station. The low number of scopes, in spite of the large ranges to be covered, is due to the fact that soft scopes, that is scopes driven at low voltage, will suffice for the time resolution required in this experiment.

It was reported that most likely the detecting chambers in the TENEX experiment would be of the hydrogen recoil type rather than fission chambers since in the former case one can get many more atoms per cm^2 so that the

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INTER-OFFICE MEMORANDUM

APPENDIX A

Date 7 June 1950

TO: - The Family Committee

FROM: Emil Konopinski and Roy Goranson

SUBJECT:

DOE b(3)

REF: ADND-3-3

PART I. THEORETICAL CONSIDERATIONS

Presented herewith are the results of discussions in which the following have participated: Teller, Goranson, Mark, Wheeler, Smith, Taylor, Hammer and Konopinski.

DOE b(3)

The types of advantage considered as possible are:

1. The increased H.E. dimensions will result in a greater compression of core and tamper if their mass is unchanged or if their mass is not scaled up fully together with the H.E. dimensions. The greater compression will produce higher central temperatures. This is partially offset, as far as the yield of radiation is concerned, by the greater density of core material which the radiation must penetrate on its way out.

2. The tamper may be thickened.

DOE b(3)

3.

For a more quantitative comparison of the above advantages, Wheeler proposed as a criterion that the quantity

E

should be maximized. Here φ is the undepleted efficiency, which primarily determines the temperature.

DOE b(3)

The second column of the table gives the mass of 25 in kilograms. The third column gives the radius R of the compressed 25 in cm.

DOE b(3)

ρ/ρ_0 is the core compression. φ and φ' are undepleted and depleted efficiencies, respectively. The column headed Y gives the expected final yields in kilotons. The final column lists the values for Wheeler's criterion.

The next two lines deal with models obtained by scaling up all radial dimensions from the first line, so as to keep the same compression.

DOE b(3)

The models of lines 5 and 6 keep the same mass of tamper as obtained in line 3.

DOE b(3)

Calculations at present indicate that this yield will be needed to assure adequate radiation temperatures.

The tamper mass in the line 6 model is the same as in lines 3 and 5

DOE b(3)

The latter model has the added advantage that it

makes the early energy evolution more secure against interruption by the tamper rarefaction. It is the model of line 6, therefore, which is recommended as the result of these discussions.

One qualification upon this recommendation was pressed by Teller.

DOE b(3)

This may constitute a hazard for the observers of the test, for the observation records of the test, or for the sites of subsequent tests. The main argument for the existence of this small chance of an excessive yield is the following: The Hippo calculations lead to much higher yields than were actually observed at Trinity.

DOE b(3)

PART II - DESIGN CHARACTERISTICS

DOE b(3)

The figures are drawn to scale as presently conceived. However, dimensions have been omitted where there exists a possibility that later minor modifications may be found to be advisable.

DOE b(3)

In Table II

DOE b(3)

These figures are compared with the three earlier preliminary design considerations listed in columns 1 to 3 inclusive.

I.B.M. calculations have been made on F-4 and F-5.

DOE b(3)

The implosion of F-4 on 0.7 scale and of F-6 on 0.6 scale have also been studied photographically and by the pin technique. Compressions given in the third and fourth columns are estimated from those calculated for the first two columns.

DOE b(3)

DOE
b(3)

There exists a small but finite probability (perhaps 5%) that the calculated efficiency may be underestimated by a factor of 50% (or perhaps even by 75%).

DOE
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). It should be pointed out, however, that the pre-detonation probability (a fizzle) is expected to be greater than the probability of an excessive yield.

DOE
b(3)

Emil Konopinski
Roy Goranson

RWG:rvc

Distribution